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Integrated Pest Management



IPM— It Works

Crop losses in the United States from pests exceed one-third of the potential crop harvest each year, with a further 9-percent lost to pests after harvest.

To combat these losses, Cooperative Extension Services in all 50 states and three protectorates have set up integrated pest management programs (IPM), often working with the private sector in establishing and developing such programs. Recent studies show that losses would be greater without these programs—ranging from 67 cents more per acre of soybeans to \$42 per acre of apples. We lack comparable aggregate figures for livestock, but losses to predators, insects and other pests are heavy.

Integrated pest management, commonly known as IPM, means the use of a combination of tactics in an overall management strategy of pest control. The goal is to produce food and fiber efficiently while minimizing the overall unfavorable effects of controlling and managing the pests.

Beginning

Extension's IPM programs began with two single-crop pilot projects in 1971. Since then, measurable benefits have included higher net income for producers, educational materials (manuals, movies, slide sets, videotapes, and others), new training programs, delivery systems (including computers, newsletters, and telephone advice), development of staff for implementation of educational programs in the field, combining of staff from various disciplines into teams, bringing people together who have differing interests within the same state, working across state lines, and involvement of the private sector.

In this issue of the *Review*, we highlight significant IPM programs

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that, by their innovativeness and ongoing success, could be catalysts in starting new programs or improving already existing ones.

For example, in one article, we'll see how urban IPM programs across the country help homeowners care for their lawns and gardens themselves, saving money and increasing their personal satisfaction. Urban IPM also shows people how to rid their homes of cockroaches. Other Extension urban IPM programs help grounds maintenance staff and commercial horticulturists increase their expertise.

Stored grain on farms around the country represents money in the bank to farmers. The IPM program in Kentucky helps farmers protect their investment by use of scouts who check for moisture, temperature, and insects. We'll look at the country's first pilot grain bin inspection program, begun in Todd County, Ky., in 1978.

Before the grain hits the bins, how do farmers protect it? We'll show how a Virginia soybean farmer and his county agent developed an IPM program that saves the farmer money, uses ecologically beneficial methods, and reduces soybean losses due to pests.

Food Production

Insects, rodents, birds, and other pests attack poultry, swine, cattle, and horses, and they contaminate their shelter and feed areas. Producers not only face reduced production as a result but also must make expensive repairs to confinement units and other buildings. We focus on IPM projects for livestock and poultry producers in Nebraska, California, and North Carolina, and the horse industry in Florida that illustrate current control methods.

IPM is important at every stage of

food production, including processing. An Extension entomology specialist in Virginia explains for us the pest management program he and others are developing for seafood processing plants. Until recently, food processors controlled insect and rodent pests almost entirely with chemical pesticides. Now, because of species resistant to the pesticides, changes in Federal regulations, and other developments, these processors need many methods of control.

Computers are helping farmers and Extension agents manage IPM programs across the country. We'll see how, in different States, IPM managers have tailored computer capability to their own needs, whether it's for historical data on crops and varieties, frequency and type of cultural practices, daily weather forecasts, daily communications among staff members, or a host of other uses.

The Future

We just scratch the surface with these stories. Many other successful IPM programs exist around the country. Future food and fiber production management systems are expected to include IPM as an essential feature. Grower organizations and agricultural consultants will continue to deliver IPM services, and they will continue to seek input from the Cooperative Extension Service. In turn, Extension staffers will provide educational materials, train personnel, and prepare packages that include IPM recommendations from all disciplines involved, and results from surveys assessing value of and need for IPM programs.

The results? Safe, efficiently produced, economical food and fiber; healthy farm incomes; and a protected, well-managed environment.

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Farmers Scout Stored Grain Investment

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Farmers storing grain should think of their full bins like bank accounts: since they wouldn't put \$50,000 in the bank and forget about it, they shouldn't store grain without checking it now and then.

That's how Earl Wiles, a farmer from Todd County, Kentucky, describes the importance of inspecting stored grain. But checking grain in storage requires time, equipment, and experience many farmers may not have. So Wiles and several other Kentucky farmers pay scouts to inspect their stored grain as part of an integrated pest management (IPM) program. The scouts probe the grain to check for moisture, temperature, and insects, and they help farmers spot potential problems which could result in spoilage and discounts at sale time.

Inspecting grain after harvest has become more important as onfarm storage has increased rapidly in central and western Kentucky over the past few years. Sixty percent or more of all grain produced in the state is stored on the farm, according to Dr. Harley Raney, Extension entomologist in the University of Kentucky College of Agriculture and coordinator of the university's IPM program.

Adding grain bin inspection to IPM was a logical move, Raney said. "We needed to take integrated pest management services beyond crop production to crop storage," he said. "A farmer's entire production efforts for a year are concentrated in one or two locations. We wanted to help farmers manage their stored grain to optimize economic returns."

Pilot Grain Inspection Program

Raney and county Extension agent Marvin Davidson began a pilot

grain bin inspection program in Todd County in 1978—the first such program in the country. That year, 15 farmers paid to have 400,000 bushels of corn, soybeans, and wheat inspected. This past winter, six counties in central and western Kentucky conducted programs inspecting more than 900,000 bushels of grain—653,000 bushels of corn, 195,000 bushels of beans, and 56,000 bushels of wheat.

The number of farmers participating and the amount of grain inspected has varied from year to year, depending on yields and on market prices. In 1980, for example, drought and heat reduced yields, and there were fewer bushels to inspect. This year, IPM staff members predict that current depressed prices will mean more grain in storage, and more to be scouted.

The grain bin inspection program provides winter work for four full-time Extension IPM agents. They are hired by nonprofit farmer cooperatives which administer county IPM programs and decide whether to offer bin inspection services.

Extension IPM agents, helped sometimes by part-time scouts, inspect bins according to varying schedules. Some counties schedule 6 to 10 regular inspections from October through March, while others schedule inspections at farmer's requests, perhaps only once or twice a season.

"How many times we inspect depends on the condition of the grain," says Daryl Templeman, Todd County's IPM agent. There, inspections are made on call from producers. "We usually do a minimum of four inspections, but we may check a bin more often, maybe weekly, if the grain has problems we need to monitor."



Grain bin inspection after harvest has become more essential as Kentucky onfarm storage has increased. Here, Extension IPM inspectors work in a grain bin to check for moisture, probe for insects, and spot spoilage problems so sales yields will not be reduced.



After each visit, agents provide reports and recommendations for clearing up any problems that can cause spoilage, such as wet grain, high temperatures, or "hotspots," and insects like weevils, moths, and beetles.

The amount farmers pay for the service varies, depending on the number of bins, the size, and their location. Costs range from about a penny to a nickel per bushel, according to Raney.

Inspection Service Worth Low Cost

Farmers say the service is well worth its low cost, especially if scouts detect problems that could mean an unpleasant surprise at the market otherwise. Howard Martin, a Todd County resident with 50,000 bushels of corn inspected by scouts the last few years, has found the program helpful every year. He's had problems in at least one bin each season, usually with condensation: moisture moves to the top of the grain and forms a crust that prevents air from moving through.

Last fall an inspection turned up a condensation problem in a bin where Martin was storing 25,000 bushels of corn. "We aerated the grain—took out the center portion and turned it around some," he says. "I may have saved \$1,000 just by catching it early enough."

Earl Wiles reports that scouts found a hotspot in one of his corn bins last year. He moved out some of the grain and ran fans to cool down the rest. "If I hadn't had it checked, I could have had a lot of corn ruined," he says. "The scouts found the problem quick enough that I didn't even get docked on the corn I pulled out and sold."

Both Wiles and Martin also discovered insect problems—*weevils*—when scouts inspected stored wheat early last fall. They fumigated bins and prevented their wheat from being discounted at sale time.

Scouts Manage Inspections

With corn, soybeans, and wheat stored in 12 different bins—6 on his farm and 6 on others—Wiles likes

the convenience of having scouts manage the inspections. He checks his stored grain some of the time, usually in the winter when he's not as busy. But, like many producers, he doesn't have the special equipment he needs. He has probes, but they aren't as long as he needs and they don't test temperatures.

Scouts use 15-foot probes to check grain in 10 or more spots in a bin, at different depths in each spot. They remove samples and carefully label them. "We can check temperatures all the way to the floor of the bin," states Todd County's agent Templeman.

An inspection may take up to 2 hours. Two scouts, hooked up with ropes for safety, go up in a bin together to minimize hazards inherent in working with grain.

To many farmers, inspecting grain in storage is a time-consuming and somewhat risky job that's better left to trained scouts. But others accompany scouts into the bin to see what problems to watch for and how they can do some checking themselves.

Learning from scouts is a long-term benefit of the grain bin inspection program that many farmers appreciate. Martin, for example, checks his grain occasionally, relying on techniques learned from inspectors. "It's an inexpensive way to learn something that will benefit you for all time," he states.

The expansion of the grain bin inspection program to other Kentucky counties depends on farmers' interest and on their financial picture, according to Raney.

"Some farmers see the service as a cost they don't want to incur," he states. "But a farmer can get his money back many times over if a scout discovers a problem in time." ■

Soybean IPM

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Soybeans are becoming big business in Virginia. Between 1976 and 1980, harvested acreage in the state rose over 50 percent. Integrated pest management (IPM) is helping Virginia's farmers handle and profit from these increases. IPM is saving them money and also improving the environment.

Before he discovered integrated pest management, Lloyd Mundie, a Richmond County, Virginia, soybean farmer used a hit-or-miss approach to insect control.

Then, in the mid-seventies, he learned about IPM from Z. L. "Pete" Newsome, his county agent. At first, Mundie tried to be his own scout and ended up producing only 10 bushels of soybeans per acre. "I didn't get the chemical down soon enough to control the worms," Mundie said, "and one field was not worth harvesting."

Scouts

By the 1980 growing season, Mundie was using scouts, people who check the fields for pests. Consequently, he had to spray only one 60-acre field that year based on what the scouts found. He said, "It was a borderline case and I might have made a good crop without spraying, but I didn't want to take a chance." Mundie farms about 700 acres on his father-in-law's farm and 400 acres on his own farm.

Scouting cost Mundie \$2 a field, plus 13 cents an acre for a weekly check. Fields are scouted for 6 weeks during the growing season, and Mundie pays for the whole service in advance. County agent Newsome recruits, trains, and schedules the scouts, and the county office of the Virginia Farm Bureau handles fees and payments to them.

In scouting Mundie's fields, workers report their findings on a



Robert McPherson uses a net to sweep a soybean field. His "catch" is dumped onto a cloth so the insects can be counted.

form developed at Virginia Polytechnic Institute and State University. At the end of the day, the scouts take their reports to Newsome who checks them that evening. If he finds any serious problems, like a buildup of insects, Newsome immediately calls Mundie so he can spray as soon as possible, often the next day.

This year, Virginia Tech analysts will feed the scout information from many of the 650 fields in the program into a computer on the campus at Blacksburg, according to William A. Allen, Extension pest management specialist. Data include the size of the insects at various stages, how many insects, degree days, and con-



Top: Lloyd Mundie, Richmond County soybean farmer (left), and Robert McPherson, check the number of insects caught on a shaker cloth in one of Mundie's soybean fields. The cloth is laid between two rows of soybeans and the plants of either side are shaken over it. Both beneficial and damaging insects that fall on the cloth are identified and counted. When the number of damaging insects reach a certain level, spraying is recommended.

Bottom: Richmond County Extension agent Z.L. "Pete" Newsome (right), works with new IPM scouts Troy Mothershead and Mark Bryant.

dition of the beans. Summaries will be made for the Mexican bean beetle, the bean leaf beetle, stink bugs, and corn earworms.

Computer Program

The idea behind the computer program, developed by Virginia Tech systems analyst William R.

Ravlin, is to assemble the data in one place where the information can be accessed by both county agents and farmers, either at the county office or on their own computer terminals if they own them. Farmers will know what is happening in their fields, county agents will learn what is happening in their counties, and both farmers and agents will know what is happening in the surrounding counties.

Pest management specialist Allen said farmers are motivated to participate in IPM because they gain more control over insects in their soybeans and they have found IPM feasible economically. "Farmers want ideas that will make them money," Allen said, "and IPM is doing that."

Before IPM, Virginia soybean farmers used three guidelines to help them decide about spraying. First, assuming their soybeans would need spraying around Labor Day, the farmers would contract in the winter for a plane to spray on a given day around that time. On that actual day, however, there might not be any insects in the soybean fields. Second, when they saw a neighbor spraying, they might spray too, and third, if they saw a spray plane in the area they might arrange to have their own fields sprayed.

A study in the early seventies showed that, of the insecticides applied to 1,700 acres of soybeans, nearly 90 percent were applied prematurely. By 1974, Extension programs and scouting had reversed this trend and premature applications in two survey counties dropped to zero. The result: a \$5-per-acre saving for the farmers.

In August 1978, Robert M. McPherson, Extension pest management specialist, assumed leadership of the soybean IPM program developed at Virginia Polytechnic

Institute and State University. By 1979, use of IPM had cut soybean acres still needing treatment solely by sprays to 35,000 and saved farmers an estimated \$700,000. Also, 90,000 fewer pounds of insecticide were being used.

Other Practices

Virginia soybean farmers make use of several kinds of pest management practices. They plant insect-resistant varieties such as Shore, use closer row spacing and biological control, spray less to permit more beneficial insects to survive, and plant trap crops.

Closer rows produce a dense canopy between rows and cut down on corn earworm damage. In biological control, farmers are controlling bean beetles with a parasitic wasp imported from India. In trap cropping, a relatively new program in Virginia, a small percentage of the soybean acreage is planted 2 weeks earlier than the main acreage. This small acreage, sometimes an acre or less, attracts large numbers of overwintering Mexican bean beetles and bean leaf beetles. The farmer treats the trap crop with a granular systemic insecticide at planting or sprays the foliage later to kill beetles before they infest the surrounding fields. Later in the season, the trap crop, which blooms ahead of the plants in the other fields, lures stink bugs to it.

Until last season, the Richmond County soybean IPM program covered only insects. Last summer, David E. Babineau, a recent Ph.D. graduate of the University of Maryland, was added to the staff to develop an IPM program in nematology and plant pathology. A weed IPM program being developed will also be added to Richmond County's program. ■

Computer Uses in Pest Management

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During crop growing seasons Integrated Pest Management (IPM) programs can generate a large amount of information that farmers need to make pest management decisions on their farms. During the formative years of the IPM program, it became quickly apparent that the use of computers was the only way to rapidly analyze and transfer all the pest, crop, and weather information critical to on-farm decisionmaking.

IPM Data in Kentucky

In Kentucky, the 1981 IPM program employed 84 investigative field scouts. They worked in 32 counties monitoring 4,300 fields, scouting through 150,000 acres of alfalfa, corn, soybeans, small grains, and grain sorghum on a weekly basis and recording data on insects, weeds, and diseases.

The Kentucky scouts also collected information on crop growth stage, the date and time of their observations, and cropping history of the field. The history data included previous crops and varieties, the frequency and type of tillage or cultural practices, and pesticide and fertilizer formulations and rates used.

The scouts in this one state program, in one crop season, used 50,000 forms to record information about fields. Some of the Kentucky farmers received more than 500 forms during the growing season. It is impractical, to say the least, for any farmer to summarize this much data for future management decisions.

To help eliminate such data summarization problems, Grayson

Brown, of the University of Kentucky Entomology Department, developed a computer data base management system in 1979 which rapidly processes IPM information.

A copy of each of the 50,000 scouting forms is sent to the university for entry into the system. All the information is used to update pest and crop forecast models, and in developing crop, field, farm, county or state summaries.

A new county-based microcomputer system is being tested in Kentucky. The data can be entered at the county level, and the county agent, supervisor, or farmer can request various summaries at any time.

The county information can then be sent via telephone lines to the main-frame computer on the University of Kentucky campus to serve as a backup, to produce state summaries, or for IPM research uses. The county information processed by Extension thus contributes to state IPM research that ultimately feeds back through Extension to increase the efficiency of Kentucky farmers' overall operations and reduce their IPM costs.

Multiple Computers Used in Indiana

Indiana's Purdue Pest Management Program (PPMP) uses five different computer systems in varying degrees. The large main-frame university computer system (a CDC 6500 and a CDC 6600) is used mainly for the analysis of research data.

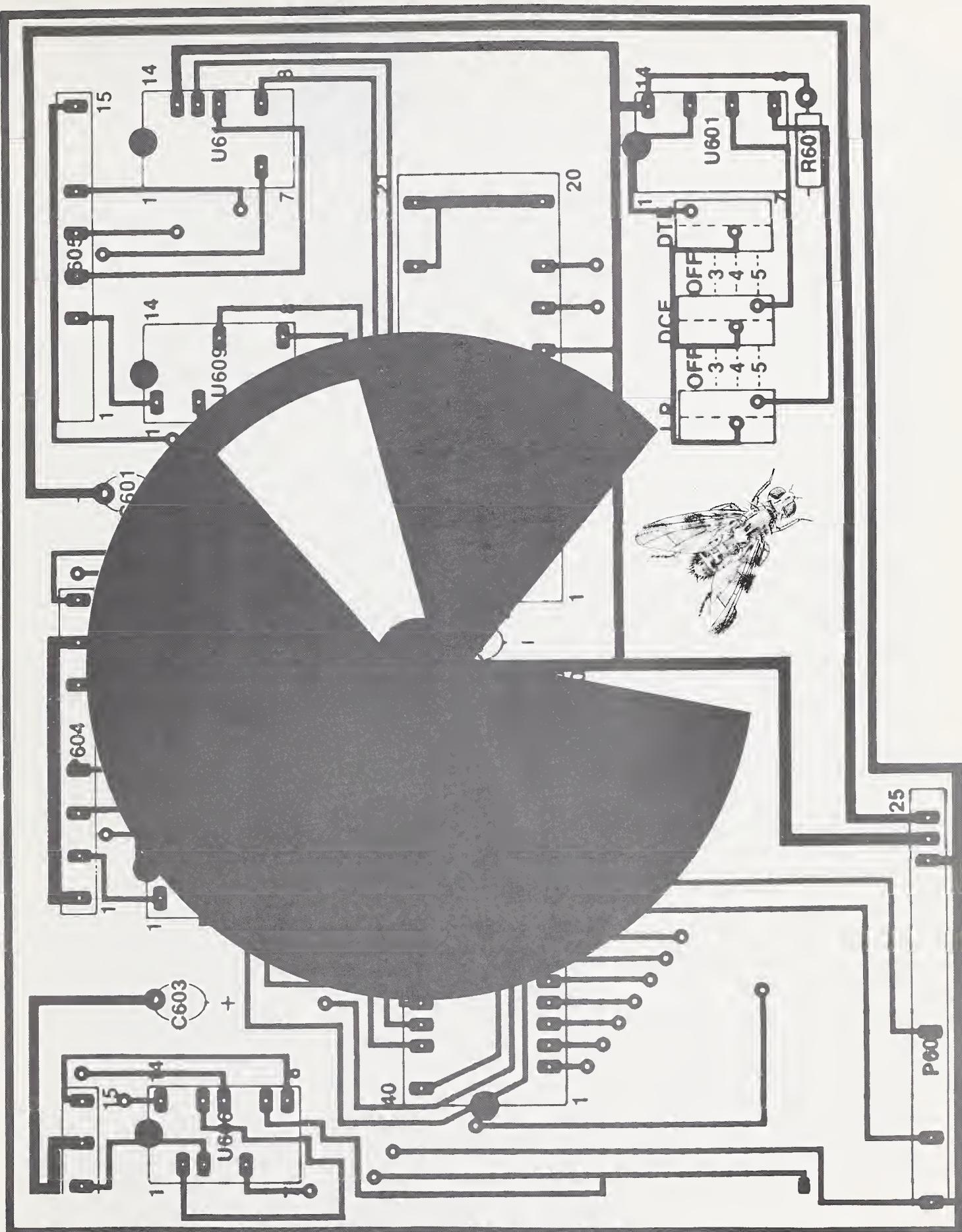
Purdue uses an IBM 360 to maintain the National Pesticide Information Retrieval System. The School of Agriculture at Purdue maintains a computer system known as the Agricultural Data Network. The computers are two PDP 11-45's and a PDP 11-15.

Along with research uses, the National Weather Service offices located at Purdue use the Agricultural Data Network to provide detailed weather information. The PPMP uses this computer system to retrieve daily weather forecasts for all areas of Indiana; 5-, 10-, and 30-day outlooks; and for agricultural advisories that are updated twice daily.

Perhaps the most valuable information the National Weather Service provides includes data on temperature ranges, precipitation, evaporation, and solar radiation gathered from 31 stations in Indiana and surrounding states. This information is used to calculate heat units, growing degree days, and degree days—all the backbone of the PPMP's predictive models.

The Indiana Cooperative Extension Service has established a unique statewide distributed processing computer system called the Fast Agricultural Communications Terminal System (FACTS). The system is made up of a stand-alone computer in each of the state's 92 county Extension offices, the 10 area offices, each of the departments in the school of agriculture, and a PDP 11-70 (known as the front-end processor).

Communications are possible among all of the terminals used in FACTS through the front-end processor at Purdue. The system is also used to transmit regular newsletters and special alerts. The PPMP has also developed a series of stand-alone programs, available in each county, dealing with pest management. These include programs for corn, soybeans, and alfalfa. They also include scouting procedures, scouting calendars, insect keys, diagnostic guides for all kinds of crop problems, and some pest control information.





The departments of entomology, botany, and plant pathology use a program on the FACTS system to store information on all of the samples that come in to their respective diagnostic clinics. This program allows researchers to examine trends in samples submitted, date of first occurrence, area of greatest frequency, and other trends.

The Indiana PPMP recently added a fifth computer system, an Apple microcomputer system. It includes two microcomputers and a shared printer, and is used to develop software, text processing, and research. Development of software is underway to be made available by the PPMP. This aids in pest management decisionmaking at the onfarm level where many farmers are using the small computers.

Cornell's SCAMP IPM Computer System

In early 1978, a computer system became operational at Cornell University under the acronym SCAMP (System for Computer-Aided Management of Pests). SCAMP is based in the New York State Agricultural Experiment Station computer center at Geneva.

SCAMP links together the Geneva research facility, the Cornell University campus, 27 county Extension offices, and research centers in the Hudson Valley and on Long Island.

The users of the SCAMP system include Extension agents, research and Extension faculty, and scouts. In addition, portions of the computer system are available to employees of the various state agencies, and individuals in the private sector such as growers, field staff, and commercial technical representatives.

SCAMP serves the IPM program in New York in several ways. First, it contains an executive program which identifies the user as a specific type, and allows that user access to certain information. SCAMP also contains data collection programs that allow scouts and IPM personnel the opportunity to store field data about pests and crops. Summary and analysis programs display the data in a form for immediate interpretation.

For example, SCAMP reports field data on the occurrences of apple scab infection periods to a data collection program which moves this information into a program displaying raw data or summarized information. An immediate "picture" of infection periods across a wide region of the state is presented to the user.

Electronic mail is also a feature of SCAMP which permits Extension agents, scouts, IPM coordinators, and other users the opportunity to converse with one another without spending a great deal of time tracking one another down by frequent telephone calls. For example, IPM scouts and Extension agents report pest observations and general crop conditions in a brief narrative form to a program called FIELD.

Research and Extension faculty use these reports to offer interpretation of trends or IPM strategies to agents and scouts through programs called NEWS and STRATEGY. Personal or specific messages are also sent through the electronic mail. For example, an IPM scout with an insect identification problem can send a query directly to the Extension entomologist without entering the general information programs.

Weather programs are among the most frequently used set of programs in SCAMP. Data from the NOAA National Weather Service

wire, from volunteer observers, and from a historical climate weather base provide information on weather forecasts and degree-day summaries. Other programs provide information on weather in a raw form from each weather station.

In addition, the weather data base helps form the insect and disease prediction models which are also stored in SCAMP. These models track and predict biological events such as potato late-blight infections, alfalfa weevil development, and the occurrence and development of approximately seven fruit insects. These programs alert Extension agents and IPM scouts to potential problems or pest outbreaks.

Finally, Cornell's SCAMP contains reference information in a program called LIBRARY. This program serves as an on-line source of pest control and agricultural information. Its subject matter is divided into several texts and includes pest control recommendations, monitoring techniques, pest life histories, notification of special phenological events, and the latest pesticide labels from the U.S. Environmental Protection Agency and New York's Department of Environmental Conservation.

From a communication perspective, the SCAMP system allows busy people the opportunity to send and retrieve useful crop protection information in a short period of time.

A \$60,000 IPM Computer Program—For Free?

That's what happened in New Hampshire. Federal leadership and funding, coupled with that of IPM specialists and research personnel, created the necessary environment for development of the IPM computer program in New York.



New York personnel developed three documents that included a users manual, an operation systems manual, and a program manual for the SCAMP IPM computer system. The New York personnel also duplicated the master operational tape for SCAMP and delivered the package to IPM Coordinator Alan T. Eaton at the University of New Hampshire.

The same kinds of computers, similar pest problems, and other considerations made the SCAMP program directly applicable for New Hampshire conditions. *Within 20 minutes, New Hampshire had the new free program operational—and used it successfully during the 1981 growing season.*

Tool for Iowa Agriculturalists

The programmable calculator has enormous value for decisionmaking guidance in many areas of crop production, as well as numerous applications in other aspects of agriculture. The Texas Instruments TI-59 calculator was adopted first for use in livestock management at Iowa State University, and applications quickly spread to other areas of agriculture.

The success of the livestock efforts was closely followed by extensive application in fertilizer batching, with much of the leadership coming from the Tennessee Valley Authority. Iowa cooperatives, farms, and agribusinesses have adopted the programmable calculator as a business tool.

Dr. S. Elwynn Taylor, Extension agronomist, has developed 28 programs in crop production and pest management. The programs are used in the TI-59, or Hewitt-Packard 41C programmable calculator. Examples of some of the programs are crop yield calculation, universal soil loss equation, grow-

ing degree days (a Weather Service method), center pivot irrigation for applying pesticides and fertilizers, black cutworm damage potential, first-generation European corn borers, corn rootworm beetles sequential sampling, and grain bin management.

Such programs provide farmers, field scouts, crop consultants, and agri-industry personnel a fast, accurate method of answering common questions. The pest management programs provide advice on the value of replanting, loss due to pests if treatments are not made, gain in yield if treatment is applied, and other similar information.

The cost for programmable calculators runs from slightly under \$300 to more than \$600 when they are equipped with extended memory modules, card readers, and printers. They are ideal for field personnel. They can be easily transported to the field and provide on-the-spot advice concerning crop production and management recommendations. Twelve area crop production specialists, three area IPM associates, and many county Extension staff now have programmable calculators for use in teaching Extension clientele and answering questions with Extension clients.

The annual Iowa Integrated Pest Management Workshop offers an in-depth programmable calculator course in agriculture for a registration fee of \$500. The fee for participants includes a Hewitt-Packard 41C calculator and a card reader for it as well as all the programs

The 1981 program was filled with 60 participants who purchased the hardware, programs, and notebooks for use in their own businesses, offices, and on their farms.

IPM At Work Nationwide

Computers in one size or another, in various levels of complexity, are being used in the IPM programs nationwide. IPM is more than chemical pesticide management. It also uses environmentally sound techniques compatible with the production of agricultural commodities and the user's objectives. In many cases, IPM includes biological and cultural controls for all pests.

IPM projects are conducted in all 50 states, in 3 protectorates, and for more than 50 agricultural commodities. Some of the IPM programs are entirely Cooperative Extension Service programs, with advisory committees at the state and county levels. In others, Extension provides the leadership, the education for personnel, and assistance to private consultants.

State IPM coordinators or IPM supervisors keep track of all this activity. The five state examples of computer uses in pest management programs were provided by Harley Raney, Kentucky; William E. Chaney, Indiana; Jim Tette, New York; Jerry DeWit, Iowa; and Alan T. Eaton, New Hampshire.

All five contributors and the others IPM coordinators and supervisors in the other states and territories agree that computer use in their IPM activities allow busy people the opportunity to send and retrieve crop protection information that is meaningful to farmers and other users in a short period of time. And when a rapid pest infestation is confronting a farmer's best cash crop, there is not much time before that farmer must decide what to do about it. ■

Urban IPM— Blooming Across the Country

Urban integrated pest management is a people-related program.

Nancy Scoville, a Prince Georges County, Md., school teacher and homeowner, used to employ a lawn service. She dropped it a couple of years ago when she signed up for the Maryland Cooperative Extension Service's urban integrated pest management (IPM) program.

"I figured I could care for the lawn myself at less money than the lawn service was costing," she says.

For \$50, a Maryland IPM scout checks Scoville's lawn, shrubs, trees and vegetable garden 15 times during the growing season for insects, diseases and other pests.

The Scovilles then follow the Extension Service recommendations.

Scoville says the IPM program has "taken the guess work out of gardening" for her. She has saved some money by using fewer chemicals, but more important she says, "I have saved some large shrubs that otherwise might have been lost."

John Davidson, Extension entomologist who heads up urban IPM at Maryland, says "the homeowner must be willing to cooperate and to follow our recommendations." He says Scoville has been very good about this and "one look at her yard tells you the program is working."

Map Project

At the start of the program, an IPM scout draws a rough map of the participant's property. The map shows the location of the house and all the shrubs, trees, and other plantings. The scout also takes a soil sample.

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Maryland is one of the few states with IPM scouts that make house calls.

On followup visits, usually weekly, the scout checks all plants on the property. The scout also notes poor planting locations and may recommend that some plants be replaced or relocated.

A photo copy of the map is sent each week to Scoville, who keeps all records in 3-ring notebook provided by the program. On the map, the scout notes the pest problems and an Extension specialist makes recommendations for Scoville to follow.

The homeowner also receives a weekly newsletter and gardening publications. The notebook has pages to keep records of spraying, pruning, fertilizing, watering, mowing, and other information. Davidson says, "the notebook provides an excellent history of the person's yard and is most useful the next season."



Top: Patton and Scoville examine insect problems on a landscape map of her property.

Bottom: Urban IPM scout Terry Patton (right), an entomology graduate student at the University of Maryland, and homeowner Nancy Scoville examine a holly bush for insects and disease.



Above: Rose Nolan clips a twig from a maple tree to check for scale insects.

Top right: Nolan, an entomology graduate student at the University of Maryland, checks for insect damage. Scouts wear this IPM T-shirt for identification.

Educational Media

Three thousand miles away in Seattle, Wash., King County, Extension agent Sharon Collman has an urban IPM program too, but she uses no scouts. She keeps her audience up to



date on pest management in the garden primarily through short courses, the mass media, and recorded telephone messages.

Using these educational media, Collman reaches homeowners, nurseries, garden centers, and pesticide applicators. The agent also writes a newsletter and columns for trade journals and newspapers.

"I don't expect to have a scout program," she says. "I'm trying to reach my audience with educational materials."

Collman believes nurseries and garden centers are putting less emphasis on chemicals. She said, "there is more precise timing and more precise selection of pesticides, so that those pesticides that are used are used properly."

Extension agent Collman was one of 85 people from 35 states who met in Dallas last November for a 2½-day workshop on urban integrated pest management. She and five others were interviewed about their urban IPM programs. Here's what they had to say.

Gary Bennett and Phil Koehler, Extension entomologists in Indiana and Florida, are concentrating their urban IPM on cockroaches in low-income housing projects in Indianapolis and Orlando.

An integrated approach to fighting cockroaches means getting families to cooperate by sealing access routes such as cracks and crevices, and around doors, windows, and pipes, and other places roaches enter.

Before the program, surveys showed an average of 120 roaches per week in the Florida apartments and as many as 200 per night in the Indianapolis apartments. After 18 months, the Florida roach count was down to fewer than 20 per week and, in Indianapolis, the count dropped to about 25 per night.

Another aspect of the integrated approach is to get all the tenants in an apartment building to cooperate in the control program. In some extreme cases where tenants will not cooperate, they are evicted if the roaches constitute a health problem. In others, peer pressure works to get the cooperation.

Turf Care

Arthur Bruneau, Nebraska Extension IPM turf specialist, uses an integrated approach to turf and lawn care in his state. This includes the use of improved grass varieties, proper mowing, watering, and fertilizing to help prevent pest problems, and the use of chemicals only when necessary.

Bruneau says some major lawn care companies are looking at IPM because their goal is to produce an acceptable turf. He says it is to their benefit and their customers' too, if they can get by with only one or two chemical applications a year rather than three or four.



Sharon Collman, King County Extension agent, Washington



Gary Bennett, Extension entomologist, Purdue University



Arthur Bruneau, Extension IPM turf specialist, Nebraska

One lawn care company is monitoring pest activity and putting the data into a computer. The data are recorded weekly and listed by zip code. Bruneau says this method gives a good fix on areas where problems are developing.

Like most Extension specialists, Bruneau uses mass media regularly. He participates in a live, hour-long television program on home horticulture called, "Backyard Farmer." During the show, viewers are invited to call in questions.

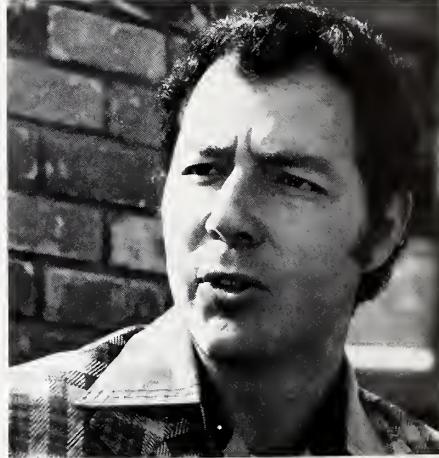
John Hartman, Kentucky Extension plant pathologist, combines turf IPM with a program for landscape ornamentals. His program, underway since 1980, aims at managers of institutional landscapes and commercial horticulturists such as lawn care companies, arborists, nursery owners, landscape contractors, and garden centers.

Hartman says grounds maintenance personnel and commercial horticulturists "benefit from this IPM program because their competence and confidence have increased." This transfer of expertise, he says, has resulted in maintenance of better plant health, and hopefully will reduce plant replacement costs.

"The key to a successful IPM program is the county Extension agent," Hartman says. The agents supervise the scouts, make reports and recommendations to users, and write and distribute newsletters. They also get the word out on IPM via newspapers, radio, and television.



Philip Koehler, Extension entomologist, Florida



John Hartman, Extension plant pathologist, Kentucky

Nancy Adams, agricultural agent in Rockingham County, N.H., does not have an urban IPM program, but plans to start one this spring.

She has a commercial IPM program for sweet corn, apples, and cole crops, and believes it will be easy to expand on these crops in home gardens since "we have pretty good monitoring techniques already set up."

Adams plans to work with a dozen homeowners and will train them to be their own scouts. With these homeowners, she conducts evening training sessions in crop culture, and pest identification and control.

Adams will visit homes weekly to get the homeowners started, then visit them about once a month as the season develops. She plans to hire no scouts.

In addressing the Dallas workshop, Texas Extension Director Daniel C. Pfannstiel said, "One of our main



Nancy Adams, Rockingham County (N.H.) Extension agent

challenges is to serve with educational programs the diverse user groups found in the urban sector. The challenge is to adapt educational programs which benefit the most people through traditional county Cooperative Extension Service offices.

Urban IPM is doing that. ■

Working Cows

*Ed Bible
Communications Director
American Polled Hereford Association
Kansas City, Mo.*

Morgan Jones claims he's a "farmer by trade," but his is no ordinary farm. It is a model of how intense management can mean success in the commercial cow business.

Nestled in the heart of Tennessee's picturesque Sweetwater Valley, Jones began shaping his cattle operation 18 years ago, buying parcels of farmland near the town of Sweetwater. He and his wife have purchased some 350 acres since then. Their business uses a program based on sound forage management, performance testing, and Hereford bulls.

"I was raised around white-face cattle," Jones says, "and decided 'way back that I wanted to develop the best herd of commercial white-face cows I could. We started with a bunch of scrub cows back in '63 and just kept building the herd with better and better bulls."

"We started on the Tennessee Beef Cattle Improvement Program in 1977," Jones says, "and it's the one single thing that has helped me make money. My county Extension agent, Robert Sliger, helped us set up the program, and it's made a big difference. For instance, I sold this year's calves at an average weight of 525 pounds. Last year they weighed 470."

The herd now numbers around 75 head, and Jones is still working toward his goal of "having bigger calves to sell in the fall." His calves are marketed through the local Smoky Mountain Feeder Calf Sale, with replacement heifers retained from within the herd. And every cattle decision is based on performance records recommended by the county agent.

Agent Contact

Agent Sliger frequently calls on Jones because of the cattle producer's willingness to accept and demonstrate recommended production practices.

"Morgan always uses performance-tested Polled Hereford bulls because he knows the value of identifying top animals," says Sliger. "We've also conducted demonstrations here on implanting, worming, and fly control. The results from this farm are helpful in our education effort throughout the county."

Performance testing is used in every phase of the cattle operation. But selection, cow culling, and replacement heifer selection are all based on what Jones can see in black and white.

"We haven't bought any cattle, except bulls, since 1974," Jones says. "And when we buy or lease a bull, we're looking for one that will give us more pounds to sell and heifers that will milk."

Selection Process

Sliger explains that heifers go through their first selection step at weaning. "We start with the heifers that are above average on weaning weight. Then we sort out the 'shorts' and other problems, taking a close look at frame and soundness. Then the heifers that are kept are assigned to either group A, B, or C."

Jones wrings all the information possible out of his cows with this system. Group A cows are those which have produced calves with the highest weaning weights, and of the three bulls he uses each year, the top performer goes with this group. Group B cows are average and he breeds them to the bull whose records aren't quite so good. C cows, the bottom cut, are bred to

produce terminal calves. Jones keeps no replacements from the C cows.

Expansion Plans

Jones says the kind of cow he likes best is "one that gets old here on the place. That means she's a good producer.

"I keep cutting the bottom end off, but I'd like to expand to around 90 cows. With my son away at seminary, I've got to make every move count."

Jones has found that implanting steers gives him a 20-pound-per-head increase in weight and that worming jumped his calves' daily gain by three-tenths of a pound, compared to the untreated calves.

"I want to wean 600-pound calves," Jones says. "I'm staying with a program that I hope will develop the kind of cow that will do that—just plain workin' cows. But to do it, I've got to use the right kind of bull. I've used bulls out of the University of Tennessee Tested Bull Sale, the local bank's bull leasing program and from area Polled Hereford breeders. They've got to show good weaning weights and we particularly need frame."

Sliger says that the county's cattle producers have seen the framey calves bring a dime (per pound) more than the shorts. "That's 50 bucks on a 500-pound calf, and Morgan was one of the first to start using bulls that would give him the right kind," the agent says.

Jones bases his future on this "right kind of cow." He's optimistic about the long-range future of the cattle business. He also knows that the best way to market the grass from his place is through cattle and he's depending on Hereford bulls and a strong farm management program to keep him in business. ■

IPM: Attacking Animal Pests

James K. Wolfe
Writer/Editor
Extension Service, USDA

IPM is involved in the long war between farmers and consumers and certain species of insects, rodents, and other pests that infest our domestic animals as well as compete for our crops.

About 10 years ago, the concept of integrated pest management (IPM) began to gain acceptance as an effective strategy. IPM is generally conceived as a combined use of chemical, cultural, genetic, mechanical and biological methods for effective, economical pest suppression. These control techniques must be environmentally sound and compatible with production and user objectives. The IPM approach brings together many disciplines—combining extension and research functions—to economically suppress pest infestations.

Pest control for domestic animals based on the IPM approach is assuming increasing importance in the states. Cooperative Extension Services' IPM programs are developing successful techniques for controlling pests on livestock and poultry.

Swine Pest Project

One of the IPM projects of the Nebraska Cooperative Extension Service, University of Nebraska-Lincoln, focuses on the rodents and birds that consume and contaminate livestock feed, cause structural damage to buildings, and spread diseases to livestock and humans.

Program personnel have given particular attention to house mice and Norway rats around swine confinement units. The rodents destroy insulation with their incessant gnawing, tunneling, and nest-building, necessitating, in many cases, expensive repairs. The Extension scientists collect and summarize information

on the extent of damage these rodents can cause in various situations and are developing guidelines to aid pork producers.

Various control methods have been evaluated in onsite studies. Publications containing control techniques have been developed for distribution to producers through county extension offices. Techniques of preventive control include rodent- and bird-proof construction plans; reduction of feed, water, and nesting sites; and such timely applications of population reduction methods as trapping and poisoning.

Cattle Pests

A recent pilot project at the University of Nebraska demonstrated the feasibility of pest management at cattle feedlots and dairies. The program was aimed at preventing or reducing fly breeding at feedlots in Dawson and Lincoln Counties, and sanitation was the major fly control element.

Fly population reduction was accomplished by cleanup and removal of breeding sites and also by feedlot design modification and by redesign of drainage systems.

Dense fly populations are implicated in the spread of disease. They also cause cattle to go off feed, and lead to reduction daily weight gain. Additionally, flies can cause cattle to bunch, and this can be dangerous in hot, humid weather.

In Riverside, Calif., a CES-integrated pest management program at the University of California has been aimed at the control of filth flies (the housefly, lesser house flies, stable flies, and blow flies) associated with animal confinement operations.

Cooperating with counterparts responsible for fly control on urban and industrial wastes, the university

began an Agricultural Sanitation Program, which includes "FOD" (flies, odors, and dusts) problems associated with animal wastes.

Studies developed from the Agricultural Sanitation Program showed that, with proper stocking rates, dusts and odors could be controlled in feedlots without increasing the production of filth flies.

Other studies demonstrated that the need for frequent use of insecticides for fly control by livestock operators has resulted in resistance to chemicals by numerous fly pests. A monitoring center for fly resistance to insecticides, established at Riverside, Calif., has been producing data that have guided recommendations for insecticide use in critical areas and on certain livestock and poultry operations.

The Agricultural Sanitation Program operates on a local level. Fly control and nuisance control committees, representing major commodity groups, governmental agencies, and university farm advisors, cooperate on issues that concern waste management methods, and make recommendations for IPM procedures. University scientists and specialists may be called upon for advice on special problems. As a result of the program, livestock owners are finding that it pays to improve the health, welfare, and living environment of their livestock.

Poultry Pests

North Carolina State University CES is using an integrated approach to manage pests of concern to the poultry industry in the state.

The objectives of the IPM program are to develop effective controls against external parasites, biting

flies, mosquitoes, filth flies, rodents, and feral birds.

North Carolina Extension staff members are attempting to measure the economic costs and benefits of the program for producers. And, to ensure that continual pest management services are available to the producer, they are training cooperative producer groups and members of private farm organizations in IPM principles.

A key element in the North Carolina IPM program is accurate and timely monitoring. A pest management agent visits each farm weekly or biweekly.

During these visits, the agent inspects the birds, buildings, feeding equipment, watering systems, and manure. The pests are identified, their population densities are determined, and recommendations on control and pest management are made.

IPM for Horses

Florida's horse industry has been rapidly expanding in the past 10 years; there are currently 238,000 horses in the state. In Florida, and throughout the United States, large equine facilities may provide ideal breeding habitats for both stable and house flies that threaten the health of horses and people.

In 1979, an IPM program was established and implemented at a large equine facility in South Florida. The program was a cooperative effort between the University of Florida CES and the Agricultural Research Service of the U.S. Department of Agriculture.

The IPM program was initiated to determine the prevalence of stable and house flies and the effectiveness of different fly control strategies.



Special traps were placed at strategic locations at manure disposal sites, stables, and paddock areas.

IPM techniques were successful in reducing the stable fly population. In another IPM study, the conversion of a manure disposal area into a composting area prevented fly larvae from breeding. This step significantly decreased adult populations of house and stable flies.

Because of equine IPM's cost-effectiveness, private industry has expressed an interest in applying IPM techniques.

As IPM efforts continue to develop in the states, problem solving will, in many cases, require interdisciplinary action. IPM is designed to improve our health and welfare and that of our livestock and poultry through a greater consideration of pest biology and the interrelationships between hosts and the environment. ■



Seafood Processors Practice Pest Control

William H. Robinson
Extension Entomology Specialist
Virginia Polytechnic Institute
and State University

Insect and rodent pests pose serious threats to the sanitation and quality-control standards necessary in seafood processing. Each establishment has its own special quality-control standards and the means to achieve them. Many seafood plant operators and managers prefer to assign one or two staff members to handle pest control (inhouse program). Others employ a professional pest control service (professional program) to handle this task. Whether plant staff or outside professionals provide the service, the most important consideration is that a pest control program be chosen.

At Virginia Polytechnic Institute and State University, our staff has begun work on an integrated pest management (IPM) program for seafood processing plants. The program, funded by the Virginia Sea Grant Program, integrates the principles of sanitation, physical/mechanical control, and chemical control through educational materials and training sessions.

Modern seafood processing establishments must comply with high standards of sanitation and pest control because of regulations and consumer expectations. Consumers expect pure, wholesome seafood products that are prepared, processed, stored, and served in a sanitary and pest-free environment. Failure of seafood processing plants to meet proper sanitation and pest control standards and other food and health regulations may incur costly regulatory action, unwanted publicity, and loss of revenue.

We held a pilot training session with seafood processors on the Virginia Eastern Shore to get their feedback before having further training workshops for other seafood processors. At this workshop, led by Marine Extension agent Tim Rippen, stationed in Hampton, I talked with the processors about their methods, showed them new types of equipment, and explained new methods of pest control. The processors later said they found the information practical and said that they had not gotten this from anywhere else.

Our program contains a set of training-resource manuals for seafood processing plant managers and pest control personnel. These manuals accompany a training session for managers and persons who will be handling pest control.

Pest Management in Seafood Processing, completed and available, presents the principles and benefits of IPM, contains a brief review of pests common to food processing plants, and lists the best chemical and nonchemical methods of control. The manual details how to select a professional pest control service and design an inhouse pest management program. Single copies are available from Chieko Hebard, Department of Food Science and Technology, Virginia Polytechnic Institute and State University, Blacksburg, Va., 24061.

Pest Management Programs for Seafood Processing and the accompanying training session, both being developed, will help the personnel responsible for the prevention and control of pests in the seafood processing plants. Emphasis will be on helping these staff members design and carry out pest management programs. The manual will

contain extensive details on pests, application methods, safe use (mixing and storage), toxicology of commonly used insecticides, and graphics illustrating how and where to spray.

We plan for the two manuals and training materials to be used in local, regional, and national training sessions. Marine Extension agents in Virginia are helping to organize groups of small, family-owned operations, and large processors for the training sessions.

Control of insect and rodent pests of food processing operations has depended almost entirely upon the use of chemical pesticides. Changes in Federal regulations, in material costs, in safety standards, and in some cases, in the pest species or the behavior of existing pests require re-evaluation of the strategies and tactics of pest control. For example, several cockroach species are resistant to standard insecticides used for years, and some cockroaches display avoidance to some of the new insecticide formulations.

Controlling cockroaches and other pests with chemicals alone is becoming increasingly more difficult. Continued dependence on chemicals for control of pests will increase the occurrence of insecticide and rodenticide resistance in the pest population—and may result in an uncontrollable increase in that population. The traditional approach to pest control—chemical pesticides—must yield to a pest management approach. ■

Marketing Cattle Board Auction Style

Daniel Linton, Jr.
Cooperative Extension Service
Auburn University

Last year, Alabama cattle producers saved approximately \$850,000 by merchandising their cattle board auction style.

The board auction system, a joint program of the Alabama Cooperative Extension Service and the Alabama Cattlemen's Association, provides producers with a vehicle to demand and receive top market dollar for superior produced, packaged, and merchandised animals.

"There must be a better way to market feeder cattle than selling them one at a time," said Harold Johnson, as he took a seat in my office. As president of the Alabama Cattlemen's Association, Johnson had traveled throughout the United States visiting with producers to discuss the industry's problems and opportunities. The cattle producer heard about and saw sick cattle arriving from Alabama. He was also aware that these animals were not sick when loaded out from the farm.

Our challenge to the Alabama Cattlemen's Association and Extension was to change the feeder cattle marketing system to benefit buyers, sellers, and livestock.

Beginning

Our first meeting centered on volume sales of farm-fresh feeder cattle of uniform weight, quality, breed, and sex. Since Alabama's cat-

tle industry is made up of small family farms with brood cow herds of less than 25 head, volume merchandising was needed. This detail didn't worry Johnson. He had an answer—invite a group of central Alabama cattle producers with large operations to merchandise cooperatively. We met with seven cattlemen and together fashioned a set of guidelines and regulations to merchandise feeder cattle directly from the farm in volume lots. Considerable resistance was raised from the traditional marketing industry, but it did little to change the direction of the seven innovators.

Here's how the board auction works: A couple of days before the sale, sellers escort prospective buyers to their farms to view sale cattle sorted into uniform lots according to sex, weight, and grade. Buyers want cattle in truckload volumes, so 60 head is usually the minimum consignment.

During the sale, cattle remain on the farm and bidding takes place in either a local auditorium or motel, or the Alabama Cattlemen's Association headquarters in Montgomery.

During the bidding, many buyers keep telephone connections open to feedlot operators in the Midwest. Buyers can attend one sale and have the opportunity to do a week's worth of buying in an hour.

Within a few days after the sale, successful buyers send a truck directly to the farm and pick up the

cattle. Within 12 to 14 hours after the calves leave the farm, most of them are eating in a midwestern feedlot. The buyer saves a big veterinary and drug bill for sick, off-feed calves.

And, buyers are willing to pay a premium for these calves.

Since the first sale, over 35,000 head of feeder cattle have been sold by this association. Savings of this group have been conservatively figured at \$50 per head or \$1,750,000 during the past 10 years.

Contributions to value, which increased producer income were: animals of superior quality, conditioned feeder cattle, farm-fresh, uniform size, uniform packaging, large sales, truckload lots, expeditious selling, alternative shipping dates, and cattle of high reputation.

In relation to traditional marketing, the board auction sales have given the innovators the following advantages: 2- to 5-cents-per-pound price advantage, 4- to 6-percent shrink advantage, marketing charges of only \$1 per head, no transportation charges, and alternative shipping dates.

The first organization, the Southeast Alabama Cattle Marketing Association, went it alone against many odds for the first 5 years, and it originated the board merchandising system in Alabama. Now, the seven original members serve as



resource people to assist Extension in helping other cattlemen who want to change their marketing system. To date, five specialized feeder cattle organizations involving 140 members are in operation in Alabama and other groups are presently getting organized. In 1981, 17,000 head of quality feeders were merchandised through the board system from April 28th to May 29th. To refine the program further, Extension provided the guidance to organize the associations into a state marketing organization so that economics could be gained in advertising and other operational methods.

Spinoff

As Extension refined the cattle board merchandising technique, new avenues were open towards expanded assistance. A new program called Stocker 700 was initiated to provide cattlemen with the know-how to take lightweight animals (300 to 400 pounds) to heavier weights (650-850 pounds) on cool-season grazing. Interest was developed in planting wheat, rye, ryegrass, and clovers during the fall and winter to provide feed for feeder cattle. Health programs, including a health seminar which about 200 attended, were expanded to provide knowledge and technical advice to producers on care for young animals to eliminate stress and to provide a more valuable, healthier animal at time of marketing. ■

We Organized By The Numbers

*Ted B. Smith
Dale County Agent
Alabama*

Thinking about organizing a board auction cattle sale? You can't do it overnight. You have to start at least 12 to 18 months in advance. Extension Livestock Marketing Specialist Dan Linton in Alabama has a schedule of things to be done 12 months before a board sale.

The first move is to contact cattlemen in your county or area who might be interested in finding a way to better market their 600- to 800-pound animals for \$20 to \$40 more per head. Explain to them what a board sale is.

If enough interest is available to move further, encourage cattlemen and some agribusinessmen to attend a board auction. This will give cattlemen a chance to see how the auction operates, and an opportunity to talk with their counterparts who have experience in dealing with this type of sale.

Be sure to involve your agribusinessmen in the effort. You can't succeed if you don't have their support. Wendall Murrah, Wiregrass Production Credit Association president, and his field men have been most helpful in our efforts.

In organizing our sale, a group of cattlemen who participated in the Central Alabama Marketing Association came and explained the program to our producers. Wiregrass PCA sponsored the meeting. They gave the pros and cons of a board sale. This would be a good idea for you to use in promoting the idea of a board sale. Then if there is still enough interest, form an organization. Elect officers and get the ball rolling. We found 20 producers from six Wiregrass counties who were interested in the program. The Wiregrass Cattle Marketing Association was organized, and April 9, 1980 was set as the date of the first sale.

One of the main reasons a sale of this type is made in the summer is that cattlemen must administer special treatment to livestock from fall until sale time the following spring. A special health program is a must. To emphasize its importance, we held an animal health workshop for all producers.

Our producers realize that organizing as a group and selling a large number of feeder cattle in uniform lots will attract feedlot buyers. Therefore, their cattle will bring 2 to 3 cents more per pound—\$15 to \$20 more per head. ■



Extension Goes Cable— in Suffolk County, N.Y.

Betty Fleming
Program Leader, Communications
Extension Service, USDA

The lights are on, the cameras are rolling, and there is plenty of action in Suffolk County, N.Y., where Extension staffers are using their resources and imagination to produce a television program seen by thousands of viewers.

The show is called "C. E. News," and according to Suffolk County Coordinator Dan Fricke it is reaching 40 to 50 percent of the total population of Long Island, both Nassau and Suffolk counties.

Produced in a news-style format, "C. E. News" is 30 minutes in length with four to five segments ranging from 2 to 8 minutes for each biweekly show. Topics have included tips on renting apartments, a 4-H International Festival, a group discussion on stress, and a bantam rooster contest with music.

"We recognized 5 years ago that most of our traditional-type Extension programs went only to traditional groups," says Dan Fricke. "We had to break out of the mold and reach more of Suffolk County's 1,300,000 increasingly urbanized and suburbanized population. We decided we needed high impact programs that were more visible and we needed to do a better public information job. We have 32 radio stations, one daily and 75 weekly newspapers, and seven cable systems on Long Island. We're trying to make the best use of them we can."

Media Method

These concentrated efforts began in the late seventies when the county hired a communications specialist. He purchased an inexpensive home video-type camera but little was done with the camera at first. A CETA aide, Louis Turner, hired to do layouts and art for publications, volunteered to try

some video production. In 3 months, he was producing shows. Turner grew up in a video-oriented home. His father is in TV service work and there was a home video camera in the Turner home which Louis Turner used for hands-on experience. The Extension TV opportunity continues to open new doors for Turner and everyone who comes in contact with the "C. E. News" show.

A communications specialist, Bob DeMattina, hired in 1980, looked at the single-topic 15-, 20-, and 30-minute shows that Turner was doing and suggested that they take a news approach. They decided to do a visual panorama of what's going on in Extension to inform people, encouraging them to contact Extension for more information.

There is no commercial broadcast TV on Long Island, although some networks now have limited news bureaus there. New York City is 70 miles away and people living in Suffolk County need cable TV to get good commercial TV reception. Suffolk County has fewer cable offerings than Nassau County, which is closer to New York City, more urbanized, and in a more competitive TV situation. The opportunities for Extension to get in on the ground floor in Suffolk County were (and are) tremendous.

Financially, Suffolk County Extension is in good shape. Part of the million-dollar budget comes from local sources, including a county farm where Extension conducts recreational and educational activities, provides vocational employment training for inmates in county correctional facilities, and produces food for distribution to local agencies. Suffolk County Extension has the largest staff (68) in the state. There are 20 professionals on the staff, many with specialist ranking.

Producing a regular, biweekly cable TV show is not easy. Getting the staff committed to such a large venture is a major challenge. The production budget can be described as "shoestring," but maybe that's what makes this such a remarkable story.

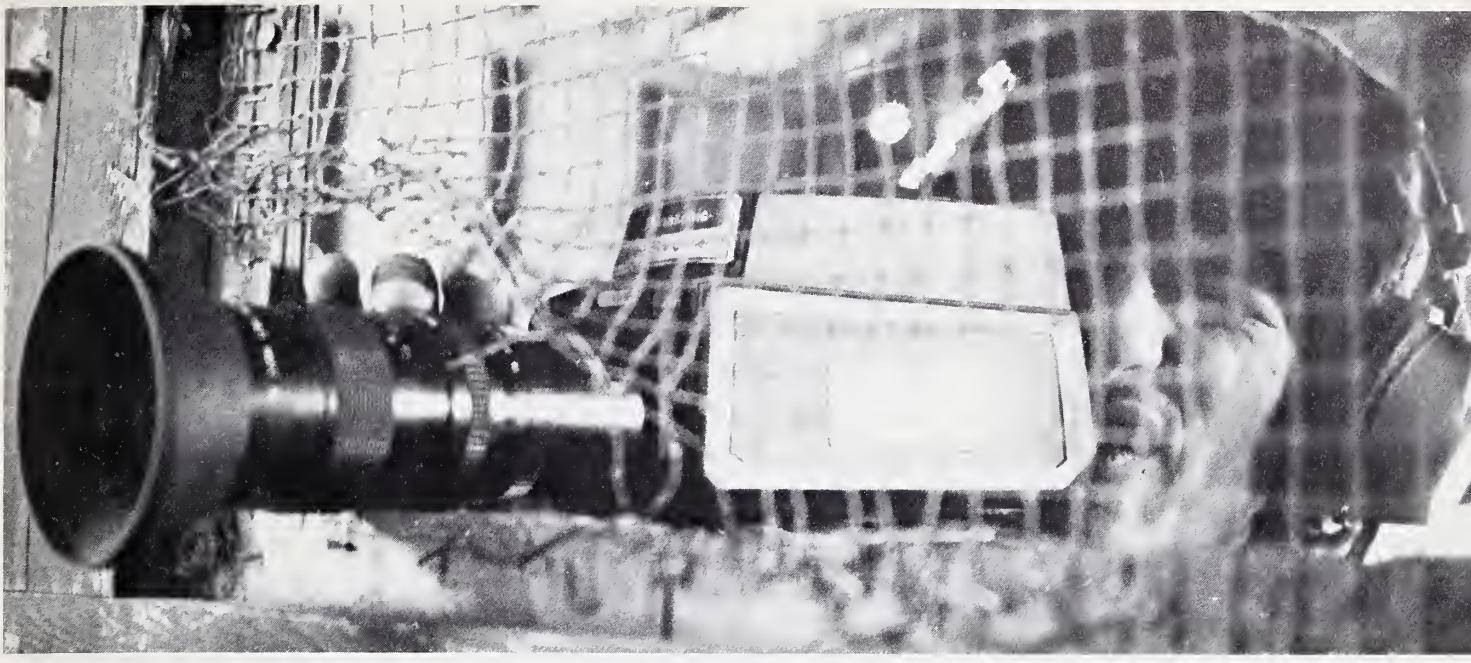
To do the first program, Turner used the cheap camera that was on hand (and is still the mainstay of the operation), a set of four lights, and a portable recording and playback video unit borrowed from Cornell University. The first program took a lot of staff orientation time, a simple outline (no script), 2 day's shooting, and a day of editing at Cornell (which involved 2 days of travel because Cornell is 325 miles away). Turner says, "We're doing a regular show that cable stations like and use with the cheapest equipment you can get."

Recent improvements include the purchase of a bottom-of-the-line editing setup with an editing controller so Turner can edit in his crowded basement office (which also serves as a hastily assembled studio).

Planning and scripting "C. E. News" now takes 2 to 3 days, plus 3 to 4 days of shooting, and 3 to 4 days of editing because there are more topics and the show is faster paced than before.

C. E. News Content

The shows are targeted to the general public so each show must contain information to appeal to many people. "We can't promote current or advance events because the shows air over a period of months," says Turner. He likes to take a traditional or familiar subject and find a new or surprise angle to it.



Some recent topics include: a flower clock auction, solar heating tips, car care, bike safety, nutrition for young people, toy safety, jeans buying, new tire regulations, master gardeners, and activities from the county farm such as a goat or poultry show.

The Process

The process for doing "C. E. News" is simple. Staff go to Turner with their ideas based on current programs.

Next, either the agent or Turner (or both) complete a script or outline. Turner then plans a production schedule and prepares cue cards (if necessary), shoots the tape (directing as he goes), edits the finished product and "markets" it, with Bob DeMattina's assistance, to cable companies.

The Budget

Dan Fricke estimates that Suffolk County now has almost \$25,000 in TV production hardware, they spend \$5,000 to \$6,000 each year on tape, and another \$5,000 to \$6,000 on new equipment or repairs, although Turner is handy there. Turner works full time on the project. DeMattina spends 5 to 10 percent of his time on it. About \$100 worth of tape and other incidental expenses go into each show.

C. E. News Promotion

Extension promotes its cable TV show through three of its own publications: "Suffolk Living," "4-H Sounder," and "Suffolk County Agricultural News." These get the word to 14,500 families. Cable outlets publicize the show in their publications such as "Cablevision" which goes to 180,000 homes. Suffolk agents all spread the word about the show through news releases and personal contacts, and they get support from a nonprofit group called "Teli-Community," designed to encourage the use of public access TV.

Other Media, Too?

Suffolk County Extension has a strong commitment to cable TV, but it also plans to use other media. Bob DeMattina has radio broadcasting in his background (along with teaching and PR experience). He surveyed local radio stations and now has a "network" of eight stations that have adopted their very own exclusive Extension "voice." Each of the eight assigned agents prepares one or two pieces of radio copy (30 to 60 seconds), each month.

In addition, DeMattina has taken on a leadership role in developing the county's new dial access system, called "Tele-C.U.E." "I see my role in things like this as developmental," he says. "I train

others to take over and move on to other ideas."

To plan these efforts, plus the special events that go on in public places, he works with an administrative group made up of Fricke and the Suffolk County program leaders to set priorities. "We also work out communications plans (and problems) in monthly staff meetings," he says.

C. E. News Spinoffs

When the county interviews candidates for positions, board members and staff look for people who are willing and eager to do media work. "They don't always have to have experience," Fricke says, "but it would probably be a good idea to make sure that's included in every job description/advertisement in the future."

Another spinoff of the project was the 1981 "video annual report" shown to a packed hall of 500 people, including the county's board of directors and advisory committees.

Evaluation

Evaluating any media effort is a tough job. Each "C. E. News" is aired a minimum of 20 to 25 times on the seven cable systems in Long Island. It is shown a dozen or more times in Riverhead alone, where 21,000 of the 50,000 residents have cable.

Top: Samuel Sabin, state horse Extension specialist in New York, films a recent segment of C. E. News in which he offers some tips in buying horses.

Bottom: Louis Turner moves in close for a shot of Wanda Mead, home economics program leader (left) and Margaret Happel, a nutrition expert.



Dreams for the Future

Suffolk County staff listed their ideas for the future. Here are a few:

- Sponsors for the show. (Suffolk staff members are talking to other states about their experience in this.)
- Grants.
- A low-power UHF station to produce and air shows.
- Volunteers to help promote the shows, maybe produce the shows.
- A broadcast-quality camera in the \$15,000 range, plus other new equipment to speed up the shooting and editing process.
- A statewide (New York) show with other counties participating and

preparing topics, some of which could be useful to all.

- Portable TV delivery equipment so that staff can use pretaped video segments from "C. E. News" at meetings.
- A New Jersey, Connecticut, Pennsylvania, and New York pool of funds and other resources to do more cable TV on a regional metropolitan area basis.
- Regional production facilities (maybe in southeast New York) supported by contributions from counties and states. The idea is that more counties could get access to TV equipment and production facilities for production of cable TV

programming, and library tape could be shared for all to use.

- Shared public service announcements. Suffolk staff has used many Cornell spots on their show. They'd be interested in learning what other states have to offer.

Can Other States Do This?

Suffolk County staff believes others can and should be doing cable TV production. "While it's certainly not advisable or cost effective for every county to do this," says Dan, "if we found ways to pool resources on a state, regional and even national basis, we could be out front with some new communications technology."

What's needed to do this in other States? Here are some tips for others.

Key Success Factors

—*Administrative people at local and state level.* These must support, encourage, and find ways in which people can produce exciting products like "C. E. News."

—*Some funds to secure equipment.* Turner says that if people are handy and can repair and recycle equipment, they could begin with an investment of \$20,000 and produce a good show for cable TV. Before you buy equipment, be sure to get recommendations from others. Plan for the future with investments, if possible.

—*If training is needed, get it.* There are courses, usually, at local colleges, or, through Extension inservice training.

—*Identify local cable stations and study their formats so you can design your show to meet their needs and interests.*

—*Develop marketing skills to "sell" your show to cable operators.* Personal contacts count! ■

Canoeists Explore County Water Resources

Mary W. Lomolino
Cooperative Extension Service
Binghamton, New York

One brisk Sunday morning, 33 hardy souls paddled from a park north of Binghamton, the county seat and largest city, for a 3-hour canoe trip. Moving "en masse" down the Chenango and Susquehanna rivers, they discovered how water resources were affected by various human activities.

The importance of water resources has become increasingly apparent to the Broome County residents of New York. Toxic chemicals were discovered in a number of municipal wells, forcing residents to boil drinking water. This practice continued until affected municipalities could install expensive carbon filtration systems or bring new wells into use.

This area of New York is normally subject to flooding, and structures to prevent this are evident throughout the county. However, few residents realize that impounded water areas in county parks are important links in an overall flood control network. Urbanites stroll by concrete floodwalls and walk on grass-covered levees, often without recognizing their function or significance. The risks and benefits of various human activities in the flood plain seldom draw attention and are poorly understood by a majority of residents.

Unique "Class"

Cooperative Extension and the Environmental Management Council, a group charged with reporting to county government on local environmental problems, recognized that citizen education on local water resources was lacking. Together, they devised a unique means of putting this "big picture" in perspective. They offered to any interested citizens a free canoe trip on the major waterways, the



Chenango and Susquehanna rivers. The group discussed a wide range of water-related topics. These included drinking water, flood protection, flood plain filling, wastewater, industrial use, recreational values, wildlife, and vegetation. Local experts were invited to join the "expedition" or meet the travelers at designated stops to share their outlook on the resource, its problems and potentials. Newspaper and radio publicity made the trip a sellout. This novel approach was intriguing enough to draw a reporter and photographer for the entire trip.

Many Surprises

Discoveries were varied; many people were surprised to see great horned owls and wood ducks thriving in an urban area. Others learned that, while some municipalities get water from wells, Binghamton utilizes the river. They learned that aquifers and surface waters recharge each other and wondered what price we pay for polluting either of them. Costly and massive flood walls and levees dramatically demonstrated the folly of extensive flood plain development. An area filled with huge chunks of concrete showed that flood plain filling constricts river channels. They could visualize how this would cause a more rapid rise in water levels and possible flooding after a heavy rain or quick thaw. A county health

department representative noted that water had improved over the past 20 years to the point where a canoe trip was not only possible but also enjoyable. A secondary-treatment sewage plant and a new positive attitude in industry were largely responsible for this progress.

The trip was enlightening in many respects. Citizens want to learn about the resources in "their own backyards" and are eager to participate in novel educational experiences. Resource people, available in the community, are eager to devote time to the public. This new approach to existing information attracted participants with varied backgrounds and left a lasting favorable impression. People enjoyed the day's content and the experience of canoeing.

Another canoe trip and an offshoot of this first trip are already in the planning stages. Future trips will take more time, so a box lunch will be provided. A registration fee will prevent "no shows" and enable us to mail out an itinerary and information packet in advance. Extension will incorporate more "hands-on" experiences by doing simple biological and chemical studies throughout the day. Finally, a self-guiding booklet will be published to take the program to people who can't participate in an organized water resources tour. ■

Volunteers Create a Healthier County

Brenda Henderson
Extension Home Economist
Montgomery County, Arkansas

Good health means a good lifestyle. That's an attitude that many residents of Montgomery County, Ark., display every day because of the efforts of 15 unpaid Extension-sponsored volunteers.

The volunteers, who make up the county health education advisory committee, are working to improve the health of county residents.

Without a budget, they sponsor swimming lessons for children, train residents to aid heart attack victims through cardiopulmonary resuscitation (CPR), promote dental health education, and have established free annual health screening clinics. Also, committee members successfully organized a countywide cleanup drive when trash littered county highways.

Montgomery County has only one physician, Dr. James Davis. He strongly supports the committee's work. "Their programs fill an important gap in area health care," he says. "We don't have time to practice preventive medicine—not with only one physician and one county health nurse for 7,800 residents. The committee has initiated programs in important areas that

would otherwise be neglected. They have made creative and ingenious use of existing resources, and they have raised people's awareness of health improvement. The real impact of their programs, a decreased death rate and a decline in disease, will be seen in the years ahead."

Committee Development

The committee was initially developed as part of an Arkansas Extension Service program in 1973 that focused on health education in this sparsely populated rural area. Supported by the state public health department, the committee began to use the experience and contacts of its members to expand their resources and achieve their goals.

The county's Extension home economist serves as an advisor and active member of the group, which includes representatives of the public health department, schools, family planning council, and social services office. Among the volunteers are a former mayor, a member of the county government, and a manager of a local manufacturing plant.

Because of its limited personnel and materials, the committee relies on

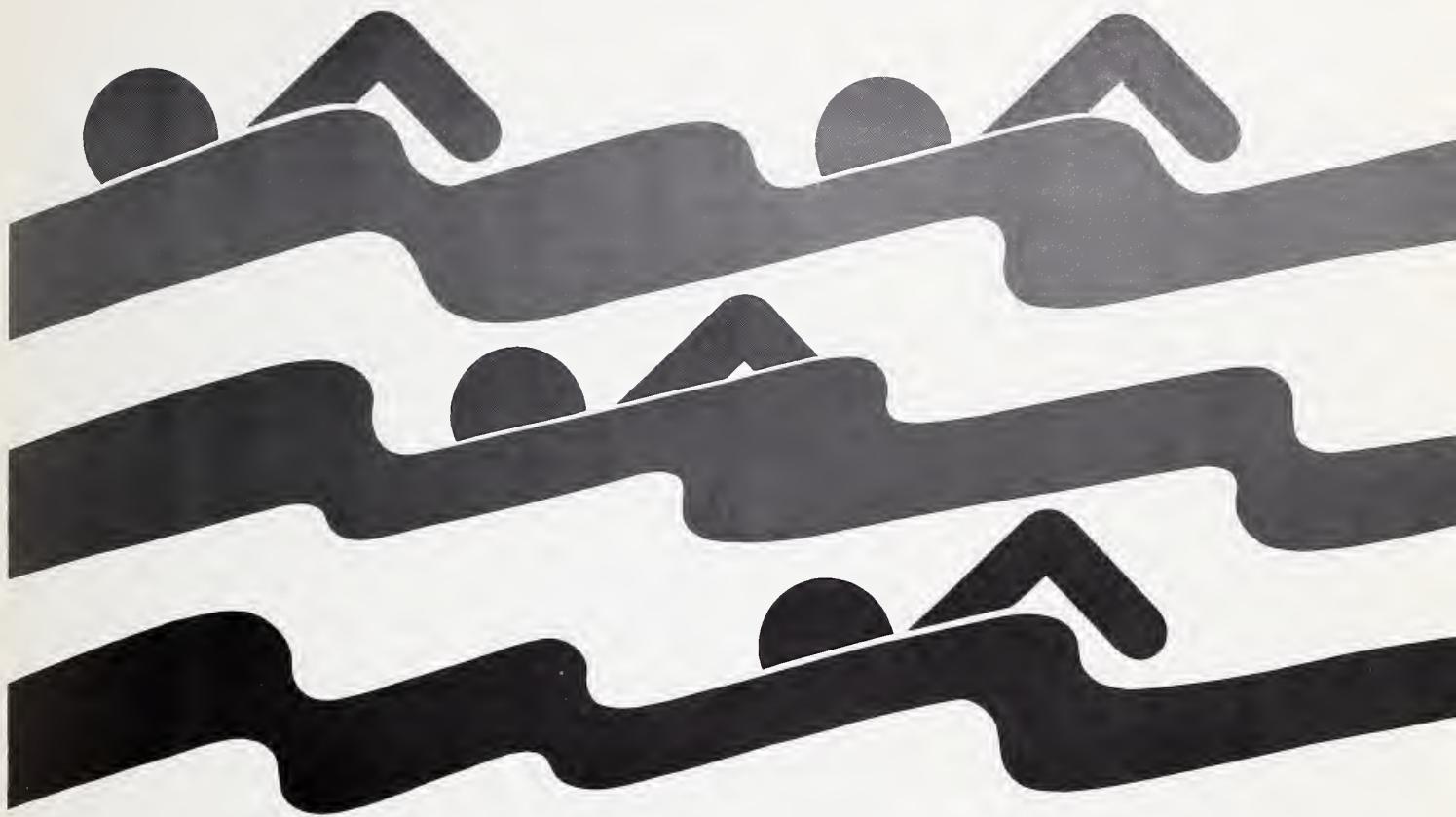
other individuals and institutions to provide needed time and services. For example, when a stopwatch was needed for CPR, they borrowed one from a track coach. A school projector was borrowed for a film on heart disease shown to community groups. Educational materials on dental health for third graders were provided by a state Extension office and a national toothpaste manufacturer.

School children have contributed posters to publicize various committee projects.

In 1978, recognizing the potential of health problems in the county and the scarcity of health services for adult residents, the committee initiated the first of the annual health screening clinics. The free clinics offer checkups to test for high blood pressure, diabetes, glaucoma, and other ailments.

The screening clinics are staffed entirely by volunteers. Nurses and an optometrist offer their time and skills, while other volunteers staff the registration and recordkeeping desks and register height and weight.

If test results suggest the presence of a disease, participants are referred



for another examination at the health department or to a physician.

The committee also recognized the need for a formal swimming program for children. The county lacked such a program, despite the presence of a major recreational area—Lake Ouachita. To meet this need, a committee member who worked part time for the U.S. Army Corps of Engineers convinced the Corps to rope off a section of the lake for lessons.

Another member, an operator of a local children's summer camp, arranged for the camp's swimming instructor to give lessons the week before campers arrived. The Extension home economist organized the program. For a small fee, covering the teacher's salary and insurance, Montgomery County children are now taught to swim by a qualified instructor.

Extension's Role

The Arkansas Extension Service program for health education is characteristic of Extension's increasing focus on health promotion activities nationally.

County extension agents in the state were urged to form volunteer committees to evaluate the health education needs of their county and develop plans to meet these needs.

In Montgomery County, the health department joined in and the committee became an advisory group for its home health service. Volunteers were recruited based on leadership ability and interest in health education.

When the committee of volunteers participated with other Arkansas Extension groups in a drive to immunize all children in the state, the health department provided materials and staff for the immunizations. The committee members and

Extension staff coordinated the volunteer efforts. Schools, Extension homemaker clubs, and other volunteers collected and compiled data and helped staff the clinics.

Over the years, the committee has come to generate its own programs targeted to the special needs of Montgomery County, although Extension workers will serve as advisors and provide materials.

Major Goal: Good Health

One of the committee's major goals is to encourage county residents to participate in appropriate physical fitness activities. To accomplish this, the committee has undertaken such projects as a day camp and the swimming lessons for children, exercise classes, and a basketball tournament for adults. Other long-term education projects focus on nutrition, dental health, and teenage pregnancy. ■

Putting The "Technical" Into Technical Assistance

Gary Holland
Technology Agent
Oklahoma State University

Technology transfer, a technique widely used by local governments and other institutions, is not that clearly defined. People have interpreted how to provide the technical assistance the technique implies in many ways, which means they have used many strategies to achieve the transfer.

Some of the people using technology transfer have focused it directly onto the day-to-day operational problems of local governments. They make a "nuts-and-bolts" assessment of these problems and prescribe a specific technical solution.

Others introduce new management techniques and methodologies to help alleviate problems that go beyond day-to-day situations. Impact studies and trend analyses, a third technique of technology transfer, give local decisionmakers data on the community as a whole and on what different courses of action may mean for its future.

The primary mission of the Cooperative Extension Service is to disseminate scientific information through education. Technology transfer fits in well with this mission, which includes working with local governments. Extension staff not familiar with technology transfer will benefit from information on how to use technology transfer as part of ongoing Extension programs.

The Cooperative Extension Service at Oklahoma State University has been working with the Southern Rural Development Center and the Community Initiatives Program (the small local government branch of Public Technology, Inc.) to test a

technology transfer model in local governments in the south central United States. Technology transfer agents, called "circuit riders," worked on assignment from Extension and from other Federal agencies to help local governments. These governments, in turn, were taking this knowledge to make delivery of city services more efficient and cost effective than it had been before.

Nationwide Network

These agents formed a nationwide network to provide information to local governments from the Federal labs, universities, technology innovation groups, and private sector. Pooling resources of these institutions increased the total effect beyond impacts that could have been achieved by each agency acting independently.

We learned important lessons from our technology transfer model. Issues faced locally require an ongoing series of choices with both short- and long-term impacts on governments' ability to operate efficiently and effectively. We found that local decisionmakers need information that lets them weigh outcomes of available courses of action. So it is essential in technology transfer to identify the available alternative technologies that could influence these decisionmakers' actions.

Yet knowing the alternatives is not enough. Technological advances are being achieved too rapidly. Decisionmakers also need information on innovative technologies being developed that could improve or render obsolete the long-term plans of local governments.

We also learned that introducing new ideas and potential changes are not usually welcomed by local government leaders. Many are not in

the business of taking risks and they prefer to look at the experiences of other local governments before acting themselves. The model technology transfer network consisted of four or five cities or counties in each region which had shown they were innovative. Their experiences provided an effective demonstration of innovative technologies from which other local governments were willing to learn.

Another critical part of the model technology transfer network proved to be the plan of work, the needs agenda. Each city and county involved in the national network submitted an annual needs list similar to those submitted by program planning and advisory committees to the CES.

Tapping All Sources

To follow up on these lists, a needs committee made up of leaders from participating cities and counties across the country drew up a needs agenda that contained the most important and most common problems experienced across the nation. The goal for each technology agent became working to get information on solutions from all possible sources. The resulting report could be useful for all local governments.

What particularly distinguished this model from others is that all three levels of local government—policymaking, planning, and implementation—became potential solutions to problems, not just one or more of the three. Technology transfer can be useful at any of the three levels.

Decisionmakers need education on technology when setting policy on what public goods and services to

develop their course of action, policymakers need technology education, especially costs of various relevant technologies, so they can begin to adjust elements of their plan to achieve their goals.

Finally, they need technology education in its most basic form when implementing the course of action they have selected. Here, success or failure to achieve their goals occurs. Successful daily operations require information on how things work, what makes them go, how to prevent malfunctions, what to do if one happens, and the like.

Big Savings

Our south-central technology transfer model has tallied some significant results in the last 2 years it has existed. For example, policymakers in one local government wanted more accurate information than they had on the impact of annexing a fast-growing area on the city's border. Using a fiscal impact guidebook from the U.S. Department of Housing and Urban Development, city planners selected the appropriate impact model from the book and developed a fiscal impact analysis for the city policymakers. Besides benefits from the study itself, the city saved the estimated \$10,000 to \$44,000 it would have cost to contract the study commercially.

In another instance, planners in a small Kansas community wanted to know where to locate a new fire station. Using a location assessment tool developed by the Oklahoma Extension Service, they learned likely results of locating the fire station at various spots in the city and could choose the best location.

Refuse collection was costing too much in Stillwater, Oklahoma. The

city management knew something had to be done to keep fuel costs from breaking the budget because an increase in refuse collection fees was not an attractive alternative. With so many alternate fuels and fuel additives on the market, the planners were not clear on the best course of action.

The technology agent working with the city planners gathered information on fuel additives and alternate fuels, such as diesel, propane, and natural gas. He presented technical and economic assessments to city decisionmakers. They opted to fuel the refuse collection trucks and the police fleet with compressed natural gas.

Roadwork

We can see other areas where Extension specialists can use technology transfer to help local decision-makers. An example, again from Stillwater, involved construction of streets and roads. Fundamental to building them to last is provision of a road base with adequate load-bearing capacity and low water permeability. A significant expense is stabilization of the soil in a road base with conventional materials, such as lime, fly ash, cement, or asphalt. Further, strict attention to quality control is necessary during application.

The technology agent identified an alternative to conventional soil stabilizers, an enzymatic liquid called "Perma-Zyme," as having potential for reducing road construction costs without reducing quality. The soil stabilization characteristics of the liquid were demonstrated on a one-quarter of a mile section of dirt road in Stillwater. After 1 year, the demonstration revealed that Perma-Zyme achieved the same soil stabilization levels as conventional stabilizers—at one-eighth the cost.

We can give you other examples. Suppose local decisionmakers want information on health care clinics and the level of care they can offer with limited financial resources. A specialist could provide an accurate picture of the alternative capital and operating funds necessary by using data on innovative and cost-effective construction technologies that would make heating and cooling of buildings less costly. Or, local city planners could come to Extension staff for help in evaluating impact of rate increases in sewer charges to replace a sewer line system that has deteriorated. If the Extension agent knows about innovative new technologies, for example, a liner for the sewer pipe that could be installed without digging up any of the streets, the agent can include that data plus the costs in the overall impact study.

Proposal

We are not recommending technology transfer as a program in itself. Rather, we are proposing that it be added to the services already available within the Extension Service nationwide network. Extension staff can be encouraged to seek information outside the system to add to that within it, to go to such sources as engineering and business faculties, such Federal agencies as Department of Housing and Urban Development, National Air and Space Administration, Department of Energy, Department of Defense, and Department of Transportation, and businesses within the private sector. A combined package approach presented by Extension staff to local government officials can add to the work already underway to ensure a prosperous environment in which to live and work. ■

Strategies Beyond Unemployment

Dave Ruesink
Extension Sociologist

Jan McDaniel
Extension Communications Specialist—
Publications
Texas A & M University

What can a community do to stimulate employment, short of often unsuccessful attempts to attract outside industry? *Creating Jobs Through Retention, Expansion and Creation of Local Firms* focuses on strategies for growth of local firms and, correspondingly, job opportunities.

Extension specialists at Texas A&M have developed publications in areas of creating jobs, coping with unemployment, preparing for jobs, placement, and personnel management. These publications are now available to all county, area, and state staff.

A county Extension agent, working with a state manpower specialist, can use information from *Jobs: Placement and Preparation* to establish a local job matching service and to provide career education. Volume one includes information on helping clients assess their job capabilities, how to look for work, and how to stay employed. A second volume contains additional

career education materials including 14 complete teaching programs.

Hard Working Task Force

The task force that compiled these materials grew out of the National Manpower Workshop held in May 1980 as the result of a statement adopted by the Extension Committee on Policy that year. The statement was prepared by a task force appointed in 1978 by the ECOP subcommittee on community development and public affairs.

Members of the task force selected four groups of five to seven people each, representing 19 states and all Extension program areas. Each group was assigned coverage of one of the four areas. Beginning in February 1981, the task force wrote, edited, printed, and distributed the materials within 10 months. Although many of these people had not worked together before, their

dedication to the Extension principle of providing useful educational material helped them complete the task quickly.

The U.S. Department of Labor and USDA's Farmers Home Administration paid for the project. The staffs of state Extension services furnished time and material.

For managers of farms and small businesses, *The Personnel Management Handbook* outlines basic principles and practices of personnel management. Volume I contains original material and volume II is a resource file of literature for additional reading.

Guiding people and their families through temporary periods of unemployment may be easier with the resource notebook *Coping with Unemployment*. It is designed to acquaint state and county staff with available materials and programs from selected states, and to help them develop their own innovative educational programs.



An explanation of manpower programs and ideas for possible approaches, *Manpower Programs: A Survey of Theory and Extension Opportunities*, was written to encourage and facilitate manpower programming in Extension. Users for which the materials have been prepared include people entering the job market for the first time, people returning to jobs after prolonged absence, people changing jobs, farm and agribusiness managers, and youth workers. Each state community development program leader and each administrator of the 1890 Extension program has received a complete set of the materials. A few additional sets can be obtained from Joe Lanham, Community and Rural Development Staff, Extension Service, Room 5048 South Building, USDA, Washington, D.C. 20250. Limited funding makes it possible to provide only a certain number of

copies to requesters, but the format allows sections to be removed easily and photocopied.

States Using the Publications

It's still early for results but in at least five States, Extension specialists report using the materials in workshops and training sessions. The Georgia staff has held two 4-hour sessions for 100 persons based on the *Coping with Unemployment* notebook. In Mississippi, Extension staff members have used *The Personnel Management Handbook* to work with business managers to improve their management skills. The same material in North Dakota is helping Extension train its own management staff. North Dakota's Economic Development Commission is using material on retention of jobs to work with local firms. Iowa Extension staff members are providing leadership training for county Extension advisory commit-

tees based on the personnel management material.

Cornell University 4-H staff plan to use the task force materials to set up job clubs for 4-H youth to get experience on how to decide on careers, how to choose and land summer jobs and temporary seasonal work.

Extension staff heading up job preparation clinics in Texas will use the manuals to work with high school juniors and seniors as they go about looking for jobs, and will train them in how to handle interviews. The students will interview prospective employers at job fairs.

If you want information on these programs or can share what you're doing in these areas, write or telephone David Ruesink, Department of Rural Sociology, Texas A&M University, College Station, TX 77843 (713)-845-0860.



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